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MEMORANDUM

DATE: October 27, 2009

SUBJECT: **1,3-Dichloropropene, PC Code 029001, DP Barcode 369764**; Responses To Technical Issues Associated With Telone Use In Florida On Golf Courses and Labeling Issues In California

PC Code: 029001	**DP Barcode:** D369764
Decision No.: 420965	**Registration No.:** SLN FL-990014 & EPA Reg. 62719-363
Petition No.: N/A	**Regulatory Action:** (587) Amendment, Non-food/feed use
Risk Assessment Type: SLN Section 24C	**Case No.:** N/A
TXR No.: N/A	**CAS No.:** 542-75-6
MRID Nos.: N/A	**40 CFR:** N/A

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This document serves as summary of the issues and Agency responses which have been identified with the use of the 1,3-dichloropropene product Curfew in Florida on golf courses [EPA SLN FL-990014]. It also addresses the issues and Agency responses associated with several product registrations in California including the product, Cordon [EPA Reg No. 62719-363]. In Florida, the issues are focused on the reduction of the restricted entry period from 5 days to 24 hours, a reduction in buffer zone distances from 100 to 30 feet, and issues associated with dermal contact with treated turf 24 hours after treatment from children playing on turf. In California, the issues include modification of labels to address issues of cab certification under an outdated ANSI standard reference, revisions to the label provisions related to the IDLH air concentration level (i.e., immediately dangerous to life and health), and removal of respirator use requirements under certain conditions. [Note: Similar issues to those addressed herein for the Florida SLN have also been raised in a proposed 24C label amendment submitted by Texas. Please also refer to DP 367952 for additional information.]

[cc: John Leahy and Andrea Carone, PRD]

Rec'd 10/29/2009

Issues Related To Golf Course and Athletic Field Turf Uses In Florida

Florida registered Curfew as a SLN (FL990014) in 1999 for the control of plant nematodes in turf. Curfew is a state registration using the federally registered product Telone EC which has agricultural uses only (EPA Reg. No. 62719-32). The Curfew application rate is significantly lower than the Telone EC application rate (3-5 gal/acre for Curfew turf use versus 9-18 gallons/acre for Telone EC agricultural uses). Curfew is required to be injected at least 5 inches deep in the soil compared to Telone EC which is injected a minimum of 12 inches. Telone is a restricted use pesticide. The current Curfew label has a 24 hour restricted entry period and a 30 feet buffer zone which was reduced from 100 feet in 2008.

It should also be noted that in 2006, a resident whose property backs up to Babe Zaharias golf course in Tampa, Florida informed state officials that he had been exposed to fumes from an application of Curfew during a treatment of the golf course. Florida state officials investigated the incident and determined that the certified applicator did not adhere to the 100 ft. buffer zone as required by the Curfew label in 2006. As a result, the applicator was fined. This incident raised the issues which are addressed herein.

The specific issues associated with label revisions in Florida include:

- the reduction of the restricted entry period from 5 days to 24 hours,
- a reduction in buffer zone distances from 100 to 30 feet, and
- a potential for dermal exposure with turf 24 hours after treatment.

Each of these issues is addressed below.

Restricted Entry Period Reduction To 24 Hours & Potential For Dermal Exposure:

The Agency does not believe that there are unacceptable risks posed by reducing the restricted entry period for 1,3-dichloropropene, marketed as Curfew for turf treatments (EPA SLN FL-990014), from 5 days to 24 hours. The is based on an analysis of the available emissions data for turf, the reduced application rates allowed on turf, and the requirements of the Curfew label for injection below the turf surface at least 5 inches which eliminates possible direct dermal contact with 1,3-dichloropropene during the period of intense emissions immediately following application. The label also specifies irrigation/rainfall requirements of at least ½ inch of water be applied to the turf within 18 hours prior to application and ½ inch of water be applied as soon as possible following application. This additional boundary layer also helps reduce emissions.

The data which are discussed herein were analyzed as part of a recent risk assessment completed by the Agency for 1,3-dichloropropene (D337328, 4/12/07). The conclusions of this analysis are consistent with those developed in D337328. In that assessment risks were not of concern for the turf scenarios which were evaluated but some uncertainties were identified and additional data were required. It is recommended that these data requirements be retained to address the uncertainties raised in the previous assessment and to confirm the conclusions drawn by the Agency pertaining to this recent label amendment (e.g., exposure monitoring for turf maintenance workers involved in soil contact activities).

In the assessment occupational exposures were estimated for those who work in turf management using conservative modeling approaches since monitoring data were not available, the potential for required buffer distances based on inhalation exposures from treated fields was evaluated for acute effects, longer-term non-cancer and potential cancer risks from a lifetime of exposure living near a treated area were evaluated, and risks from community level exposures were calculated based on ambient air monitoring.

Several emissions studies were considered in the development of the risk assessment but two studies were conducted to evaluate emissions from treated turf (EPA MRIDs 451207-01 & 451207-02). These studies were completed in southern Florida in areas where this usage pattern on golf course turf and athletic fields would typically occur and were completed using similar application methods. In both cases 90 percent or greater of the cumulative emissions were observed in the 24 hour period immediately following application (Table X7, D337328). Based on these results, it is not believed that the risks associated with the duration after application are dramatically impacted by allowing for more time to pass after the first 24 hour period (i.e., cumulative emissions are not demonstrably time sensitive past the 1st 24 hour period after application). Buffer distances are based on a consideration of the acute inhalation endpoint. When the buffer distances were calculated using the PERFUM model the predictions for all situations which were considered (Table 7, D337328) resulted in buffer distances at the edge of a treated field (i.e., 0 meters). Additionally, when a more conservative modeling approach was employed based on the ISCST3 model coupled with static, near calm conditions risks were still approximately 3.5 times lower than the Agency's acute level of concern 25 meters downwind of a field even based on a 40 acre sized treated square area which is highly unlikely for this use pattern (Table C3, D337328). For acute occupational exposures on turf, risks are generally not of concern based on a similar ISCST3 calculation that involved a shorter exposure duration coupled with peak emissions estimates (Table 18, D337328). Non-cancer risks from longer-term exposures and cancer risks were also not of concern even when the highest available applicable exposure estimates were considered as the basis for the risk assessments (Tables E2 & E3, D337328). It is not likely that reducing the restricted entry period to 24 hours would substantively increase risks because of the emission profile observed in the turf studies. Also, over more extended periods it is less probable that individuals would be at a fixed location over such extended periods. It is clear that there are some circumstances that individuals could be at a specific location for such periods but there is clearly a large segment of the population which would also not have such sedentary behaviors.

Overall exposure from 1,3-dichloropropene is predominantly via the inhalation route because of its volatility but the possibility exists that there could be a negligible contribution to exposure via the dermal route. Exposures could occur because volatilization could persist after the 24 hour entry restricted period and individuals could come in direct contact with the treated turf. However, the amount of the applied to which an individual could be exposed dermally would be anticipated to be negligible since the emission profile after application to turf indicates that 90 percent or greater of the total mass applied is emitted in the first 24 hours after application. Also, dermal adherence and absorption processes would be minimal again because of its volatility. The application rate is also relatively low compared to agricultural uses. In fact, in previous assessments the Agency reached similar conclusions pertaining to the possibility of dermal exposure for all uses including agricultural applications which occur at much higher application rates (http://www.epa.gov/pesticides/reregistration/status_page_t.htm). The *Toxicological*

Profile for Dichloropropenes developed by ATSDR (http://www.atsdr.cdc.gov/toxprofiles/tp40-c6.pdf) also supports these conclusions. ATSDR discussed *Kezic et al* in which it was concluded that when whole-body dermal exposure is compared with inhalation, dermal uptake amounts to only 2 to 5 percent of absorption through inhalation.[1] This consideration further minimizes the potential that the dermal route of exposure is a significant contributor to overall risks. ATSDR also indicated gross and histological examination of the eyes and skin of rats and mice exposed to up to 150 ppm Telone II for 13 weeks (Stott et al. 1988) or to 60 ppm for 6–24 months (Lomax et al. 1989) revealed no differences between exposed and control groups.[2] [3]

In summary, the available emissions data from treated turf, the results of the current risk assessment which does not indicate any risks concern from inhalation exposures even for agricultural uses at much higher application rates, and the low likelihood of any dermal exposures of concern support the reduction of the restricted entry period from 5 days to 24 hours for uses on turf (e.g., golf courses and athletic fields).

Reduction In Buffer Zone Distances From 100 To 30 Feet:

The Agency does not believe that reducing the buffer distances for 1,3-dichloropropene from 100 to 30 feet poses risks that exceed EPA's level of concern. Buffer distances for 1,3-dichloropropene were established based on the concerns over exposures which are longer-term in nature (i.e., cancer endpoint). This differs from other fumigant chemicals where the key concern is the acute exposure scenario. In the existing risk assessment for 1,3-dichloropropene (D337328, 4/12/07) buffer distances were calculated using the standard approach based on PERFUM and an acute toxicity endpoint but all analyses indicated results of (0) meters. Even when a more conservative modeling approach for acute exposures was employed using the ISCST3 model with a large field and static weather conditions (i.e., 40 acre field with near calm conditions and single wind direction) risks were still approximately 3.5 times lower than the Agency level of concern 25 meters downwind of a 40 acre field (i.e., MOE = 109, Table C3, D337328). Additionally, when ISCST3 predicted risk estimates at 100 meters are compared to 25 meter values the difference in risks are less than a factor of 2 coupled (i.e., MOEs decrease from 173 to 109) with an associated change in distance by a factor of 4 (Table C3, D337328). It follows that the acute risks associated with a reduction in buffer distance can be evaluated using this relative rate of change. The proposed reduction in buffer distance from 100 to 30 feet is approximately a factor of 3. Therefore, the associated risks would increase by less than a factor of 2 resulting in risks estimates that are still lower than the Agency level of concern.

It should also be noted that monitoring data do not indicate risks of concern for all turf scenarios and durations of exposure considered based on the turf emissions data even if adjusted to the maximum allowable application rate (Tables E1-E3, D337328). However, monitoring data are spatially and temporally limited because they represent a result for only a single space and time.

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[1] Kezic S, Monster AC, Verplanke AJ, et al. 1996. Dermal absorption of cis-1,3-dichloropropene vapour: Human experimental exposure. Hum Exp Toxicol 15(5):396-399.

[2] Stott W, Young J, Calhoun L, et al. 1988. Subchronic toxicity of inhaled technical grade 1,3dichloropropene in rats and mice. Fundam Appl Toxicol 11:207-220.

[3] Lomax L, Stott W, Johnson K, et al. 1989. The chronic toxicity and oncogenicity of inhaled technical grade 1,3-dichloropropene in rats and mice. Fundam Appl Toxicol 12:418-431.

Air modeling for cancer risks has not been completed at 30 feet because currently available models do not accommodate this type of analysis nor has Dow Agroscience suggested modeling approaches to support the reduction in buffer zone distance based on cancer risks. The Agency believes it is not appropriate to consider the same type of rangefinder assessment approach described above for the non-cancer endpoints to evaluate the impact of a reduced buffer distance on the potential cancer risks associated with the golf course use for 1,3-dichloropropene. This is because cancer risk calculations should address the likelihood of living in different locations over a lifetime or changing daily activity patterns over a lifetime. Because of these considerations, the Agency instead evaluated the issue of possible increased cancer risks associated with a reduction in buffer distance to 30 feet for golf course treatments using the turf emissions data in conjunction with available ambient air monitoring data. Cancer risks amortized over a lifetime based solely on the turf emissions data do not indicate a risk concern. These estimates could be considered conservative because they reflect proximity to an application amortized over an entire lifetime and such proximity is not likely for all applications encountered over such a timeframe (Table E3, D337328). They also, conversely, may not be a conservative estimate of risk for those who live near golf courses in agricultural production areas with substantive 1,3-dichloropropene use.

It is most likely that over the course of a lifetime that potential exposure would be more sporadic because most individuals live in several locations which probably reduces the overall opportunity to be exposed. It is also possible that over a lifetime exposures from 1,3-dichloropropene could occur from several possible sources including turf and agricultural uses since they tend to be regionally located in areas with similar pest pressures. It should also be noted that agricultural uses occur at much higher application rates which would contribute more significantly to lifetime cancer risks for people living in those areas. Thus attempting to define a buffer distance based on one contributor to overall cancer risks in a quantitative manner is not scientifically appropriate especially for a use pattern which would not likely be a major contributor to lifetime exposure levels (i.e., because of lower application rates and use is not widespread). As such, regional use patterns are likely more important indicators of lifetime exposures than whether or not a buffer is 30 or 100 feet especially when turf applications are very infrequent and occur at lower application rates. Given this consideration, ambient air monitoring data collected under a variety of conditions serve as an appropriate basis for evaluating potential cancer risks. In the risk assessment (D337328) community air monitoring data collected in growing regions in California during the season of use and also urban background levels indicate cancer risks were not of concern. It also should be noted that increased golf course uses of 1,3-dichloropropene would not significantly impact these values because their relative emissions contribution to the impacted airsheds would be minimal compared to the overall contribution from agricultural uses which are more prevalent and tend to occur at higher application rates.

In summary, the Agency does not believe that reducing buffer distances from turf treatments as described in the Florida SLN label to 30 feet from 100 feet will present undo risks of concern. This is based on the analysis for all non-cancer durations of exposure which do not result in any risks of concern. Also, it is supported because cancer risks based on the turf emissions data and the ambient air monitoring data do not illustrate any risks of concern even considering the uncertainties associated with each type of data and the approaches used to evaluate it.

Issues Related To Use In California

Several issues were raised by Ann Prichard, a scientist at the California Department of Pesticide Regulation (DPR), that suggested Telone labeling be should be modified.

The specific issues associated with label revisions in California include:

- conformance with an outdated ANSI reference standard for tractor cab certification,
- label provisions related to the IDLH air concentration level, and
- respirator use requirements when there is no liquid contact potential.

Each of these issues is addressed below.

ANSI Standard Conformance:

The Agency concurs that a reference to the American National Standards Institute (ANSI) standard S525-1.1 (Agricultural Cabs – Environmental Air Quality) should be removed from 1,3-dichloropropene labeling. This standard has not been implemented by ANSI because manufacturers of agricultural equipment do not wish to certify cab performance based on this standard for their products over their lifecycle as they cannot be responsible for maintenance and use conditions that can vary and significantly lower their performance over time. This rationale is plausible to the Agency. However, there are certain elements of the standard which the Agency believes are appropriate for continued inclusion in labels given the proper criteria are established to ensure their efficacy. These include the requirements for a minimum pressurization exceeding 58 Pa (6 mm H_20) for a totally enclosed cab and for minimum air flow requirements of 43 m^3/hour. The Agency is comfortable with these criteria because of the development efforts associated with the ANSI standard S525 involved agricultural engineers as well as health and safety professionals. The pressurization ensures positive outflow of air during operation which prevents infiltration of airborne concentrations of 1,3-dichloropropene from treated fields if emissions occur. This is a common engineering approach. Additionally, an airflow rate of 43 m^3/hour equates to about 12 air exchanges per hour (i.e., once every 5 minutes) for a cab which is about 8ft. square by 8 ft. tall. These requirements cannot be taken out of context because they require criteria to ensure that the source of make up air, which is critical to the efficacy of this approach, is free of 1,3-dichloropropene residues. In order to ensure this, the Agency is also recommending that the current requirements for charcoal filtration in cabs which are compliant with existing Telone labels be retained. These requirements include the use of filters which contain no less than 1000 grams of charcoal and that they are changed after no more than 50 hours of application time. The need to provide confirmatory data supporting these criteria was discussed in a July 9, 2009 meeting with representatives of Dow Agrosciences. The Dow representatives indicated that they had developed empirical data which demonstrate the efficacy of charcoal filters against 1,3-dichloropropene residues and also had developed data to support the service life specified in the label. The Agency also had concerns about ensuring that the performance criteria established for pressurization and airflow are maintained by cab users over time. It was discussed that verification of these parameters could possibly be done as a simple industrial hygiene activity at periodic intervals. The specific requirements of the inspection process have not been developed but biannual certification for airflow requirements

and perhaps a site gauge to quantify pressurization in real time would be appropriate (e.g., a U-tube such as used for homeowners in radon remediation devices).

It should also be noted that many applications of Telone occur concurrently with other fumigant chemicals including chloropicrin and/or metam sodium or potassium. These fumigants have odor threshold properties associated with them. In fact, the Agency continues to rely on the irritation properties of chloropicrin as a warning agent as a main component of its recent decisions for managing worker risks with these chemicals and the use of other combination products. This property of these chemicals also supports the approach outlined above. If there is breakthrough of the warning agent through the charcoal filter the operator would be instructed to stop and exchange the used for a fresh filter before continuing operations. This is consistent with the industrial hygiene practice used for requiring respirator cartridge changes in all types of venues.

Based on the criteria discussed above the Agency believes it is appropriate to remove references to the ANSI standard as described in the comments from DPR but it does not believe that a cab cannot provide respiratory protection from 1,3-dichloropropene. However, the Agency also requires that the supporting data which have been apparently developed by Dow Agrosciences be submitted for review purposes to ensure the criteria are adequate and to ascertain if additional supporting information needs to be developed for 1,3-dichloropropene only products.

Label Revisions For IDLH On Telone/Chloropicrin Combination Products:

The label revisions suggested in the comments pertaining to the concentration value specified for the Immediately Dangerous to Life or Health Concentrations (IDLH) is specified as 4 ppm for combination products containing 1,3-dichloropropene and the fumigant chloropicrin. The National Institute for Occupational Safety and Health (NIOSH) specifies IDLH values for use by occupational health professionals and other impacted parties. A website listing entitled *Documentation for Immediately Dangerous to Life or Health Concentrations (IDLH): NIOSH Chemical Listing and Documentation of Revised IDLH Values* can be found at the following http://www.cdc.gov/niosh/idlh/intridl4.html. This list only contains information for chloropicrin and none is specified for 1,3-dichloropropene. Since there is only an IDLH value specified for chloropicrin (see http://www.cdc.gov/niosh/idlh/76062.html) and it has been reduced by NIOSH as reported in their documentation from 4 to 2 ppm the Agency concurs with DPR that the labels for Telone combination products containing chloropicrin should be altered to reflect this change.

Label Requirements For Respirators With No Liquid Contact Potential (e.g., Yetter Rig):

In proposed label revisions Dow Agrosciences recommended removing the requirements for using a respirator on 1,3-dichloropropene labels for sole products and combination products containing chloropicrin when there is no liquid contact potential (e.g., with a Yetter rig). DPR indicated in their comments that it "does not have data to show this type of application can be safely conducted." If 1,3-dichloropropene is used in combination products with chloropicrin the labels for these products will be revised based on decisions put forth by the Agency in May, 2009. The respiratory protection strategy is based on a multi-dimensional approach which uses the established warning agent properties of chloropicrin, respirator use, real-time in-field monitoring and administrative controls (e.g., it establishes criteria under which applications are to cease) to manage worker exposure levels. The following describes the requirements which

have been established for products which contain chloropicrin (these can be found at the following site, http://www.epa.gov/oppsrrd1/reregistration/soil_fumigants/worker-protection-fs.htm):

- Handlers must either stop work and leave the area or use air-purifying respirators if they experience sensory irritation,
- Air monitoring while handlers use respirators to ensure concentrations do not exceed the upper working limit of respirators,
- All handlers who will wear a respirator must be fit-tested, trained, and medically examined to ensure they do not have health problems such as a heart condition that could make use of a respirator dangerous, and
- Respirator and cartridges must be available for each handler who will wear a respirator.

In cases where tractors with cabs are utilized, the Agency response to the ANSI cab certification issue described above would apply in that the charcoal filtration and properly functioning cab would be protective given proper operation and maintenance. Additionally, if there were a technical problem such as filter breakthrough because of overloading, applicators would be required to heed the same criteria for using respirators or stopping work based on the sensory irritation properties of chloropicrin which provides an additional safeguard. For individuals involved in the application process who are not in a tractor cab, the sensory irritation criteria outlined above for chloropicrin containing products would apply and combination product labels will be revised on a schedule outlined in the May 2009 regulatory decision to reflect this change. For individuals involved in the application process who are not in a tractor cab, respirators would still be required for all products that contain solely 1,3-dichloropropene.

In summary, the Agency believes it is appropriate to not require respirator use for Telone combination products which contain chloropicrin based on the criteria outlined in the risk management decisions from May 2009 by the Agency for chloropicrin. This is premised on also accounting for the recommendations described above for implementing a process to ensure proper cab use and performance for those involved in applications who may be in closed cabs. This also applies to those who are involved in applications of Telone products that contain only 1,3-dichloropropene. For those not in cabs, current respiratory protection requirements would remain since a warning agent property cannot be associated with the use of these types of products.

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